

12.1 MACRO PHOTOGRAPHY

One thing digital cameras are great for is photographing small objects—coins, jewelry, prints, maps, even insects—anything small enough to fit on a tabletop. You can put photos of your collectibles onto a Web page, sell them on an on-line auction, or make prints to file in a safe deposit box for insurance purposes. In close-up or tabletop photography, digital cameras have a huge advantage over traditional film cameras because you can review your results and make adjustments as you shoot. If a photo doesn't turn out as you'd hoped, just delete it and try something new. A film photographer has to wait to get the film back from the lab before they can make adjustments. By then, they have probably taken apart the tabletop setup or forgotten what it was they did. Take advantage of your instant feedback to experiment and learn.



Macro photographs can reveal stunning details of the world around you.

The guidelines that follow are just that—guidelines. Feel free to experiment and break the rules. Never let the fact that you don't have something like a light source stop you. Innovate and experiment. That's how great photographs are taken.



A rainstorm brought leaves down onto a skylight. A ladder and macro mode captured this backlit image.

Macro Lenses

When photographing small objects from coins to insects, your lens' minimum focusing distance determines how close you can get to the subject. The closer you can get to a subject, the larger it will be in the final image. A tiny coin surrounded by a large background isn't what you're trying to get. You're trying to get a large coin surrounded by a small background. For many pictures, just zooming your lens in on the subject will suffice. However, macro mode allows you to get a lot closer to the subject, making it much larger in the final image. If you can't get close enough to an object to fill the image area, you can always crop out the unwanted areas later. Just keep in mind that you don't have a lot of pixels to begin with and the more you crop, the smaller the image will become.

Keep in mind that when composing the image, you should use the LCD monitor, especially when closer than about 3 feet (90cm). If you don't, the object centered in the scene won't be centered in the photo.



A monarch butterfly larva forming a chrysalis.

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This small, but very colorful caterpillar was captured with a macro lens.



Here a leaf hopper is caught by a macro lens.



Focusing and Depth of Field

If you look at some close-up photographs, you will notice that very few of them appear to be completely sharp from foreground to background; in other words, the depth of field in a close-up tends to be shallow. The depth of field in an image depends on how small an aperture you use, how close you are to a subject, and how much the lens is zoomed. When you get the camera really close, don't expect much depth of field—maybe as little as a half-inch. It's best to arrange the objects so they all fall on the same plane. That way, if one's in focus, they all will be. Another thing to try with a zoom lens, is to use a wider angle of view. This will give you more depth of field if you don't also have to move the camera closer to the subject (doing so will offset the advantage of the wide-angle lens).

Also, when you focus, keep in mind that depth of field includes the plane you focus on plus an area in front of and behind that plane. You'll find that in close-ups half of the sharpest area will fall in front of the plane on which you focus and half behind it.

Shallow depth of field has its own benefits, so you don't necessarily have to think of it as a problem. An out-of-focus background can help isolate a small subject, making it stand out sharply.



In the left photo, a small aperture has given great depth of field. In the right photo, a large aperture has given a shallow depth of field. In both images, the camera was focused on the same building.

Tip: Use the LCD Monitor

When taking macro close-ups, especially at distances of less than 3 feet (90cm) use the LCD monitor to compose the image. If you don't, you won't be able to preview depth of field. Also, since the viewfinder is offset from the lens, the area seen in the viewfinder will differ from the area included in the image.

How To: Increasing depth of Field in Close-ups

- Increase the illumination of the subject to stop down the aperture.
- Don't get any closer to the subject than you have to.
- Focus on something in the middle of the scene (front to back) since in close-ups, depth of field is half in front and half behind the plane of critical focus.
- To increase depth of field, switch to aperture priority mode and select a small aperture such as f/11.

Exposures and Backgrounds

The exposure procedure for close-up and tabletop photography isn't a lot different from normal photography but you have the opportunity to control lighting. The biggest difficulty may arise from automatic exposure. Many close-up photographs are of small objects that don't entirely fill the viewfinder frame. Automatic exposure systems can be fooled if the brightness of the small object is different from the brightness

of the larger background. The meter averages all of the light reflecting from the scene and may select an exposure that makes the main subject too light or too dark. In these cases, use exposure compensation to adjust for the background. If an image is too dark, increase the exposure. If the image is too light, decrease the exposure.

Some thought should be given to the background you use. It should be one that makes your subject jump out, and not overwhelm it. The safest background to use is a sheet of neutral gray poster board that can be formed into a curved "L" shape to give a nice smooth gradation of light behind the image. It's safe, because it reduces potential exposure problems and most things show well against it. Other options include black or white backgrounds but they may cause some exposure problems unless you use exposure compensation. Finally there are colored backgrounds, but these should be selected to support and not clash with the colors in the subject.

The texture of the background is also a consideration. For example, black velvet has no reflections at all while black posterboard might show them.



A dark background sets off the small white sculpture.

Arranging Lighting

The lighting on small objects is just as important as it is for normal subjects. Objects need to be illuminated properly to bring out details and colors well. You can light a subject in several ways, depending on your objectives. A flat object needs to be illuminated evenly; an object with low relief, such as a coin needs to be cross-lit to bring out details; some objects might look better with the diffuse lighting provided by a light tent (see below). Electronic flash can freeze action and increase depth of field. Your options are varied, limited only by your willingness to experiment.

Flat copy such as posters, stamps, prints, or pages from books require soft, even light over their surface and the camera's image sensor must be exactly parallel to it to prevent "keystoning." Even then, most lenses will

curve otherwise straight lines at the periphery of the image because they are not designed for copying and are not perfectly rectilinear. (This is called curvilinear distortion.) There are other lens aberrations that make it difficult to keep the entire image in focus at the same time. This is one reason to use a small aperture that increases depth of field and uses the center portion of the lens where aberrations are least likely to affect the image.



When photographing flat copy, you need even lighting.

Keep in mind that the color of the light you use to illuminate an object may affect the colors in the final image. Tungsten bulbs will give it an orange cast and fluorescent lights will give it a green cast. You'll have to experiment with this aspect using manual white balance settings (see page 46). In other cases, you may find that you like the artificial colors or you may be able to adjust them in your image editing program.

Using a Reflector to Lighten Shadows

When the light illuminating a small subject casts hard, dark shadows, you can lighten the shadows by arranging reflectors around the subject to bounce part of the light back onto the shadowed area. You can use almost any relatively large, flat reflective object, including cardboard, cloth, or aluminum foil (crumpling the foil to wrinkle it, then opening it out again works best). Position the reflector so that it points toward the shadowed side of the subject. As you adjust the angle of the reflector, you will be able to observe its effects on the shadows. Use a white or neutral-toned reflector so the color of the reflector doesn't add a color cast to the image.

Using a Light Tent

One way to bathe a subject in soft, even lighting—particularly useful for highly reflective subjects such as jewelry—is by using a simple light tent. The object is surrounded by a translucent material which is lit from the outside. If the subject is small enough, you can use a plastic gallon milk bottle with the bottom cut out and the top enlarged for the camera lens. When positioned over the subject and illuminated by a pair of floodlights, the light inside the bottle is diffused by the translucent sides of the bottle. The result is a very even lighting of the subject.

Larger subjects require larger light tents. You can construct a wooden frame and cover it with cloth or plastic sheets. When illuminated from outside by two or more floodlights, the light within the tent will be diffuse and nondirectional.

Using Flash in Close-ups

There are two important reasons to use flash in tabletop photography. With flash, you can use smaller apertures for greater depth of field, and extremely short bursts of light at close distances prevent camera or subject movement from causing blur. Using electronic flash with predictable results takes a little effort and you may need to practice and experiment.

External Flash

Direct on-camera flash doesn't give a picture the feeling of texture and depth that you can get from side-lighting. If you use an external flash, you can position the flash to illuminate the subject from an angle for a better lighting effect. External flash units can be connected to the camera's connector for external flash or can be a slave unit that fires when it senses the on-camera flash firing.



Flash was used to freeze this small green stinkbug.

Flash in Close-ups

When using flash for macro close-up images the flash may not fully illuminate the subject because of its position. Be sure to take a test shot.

Ring Flash

A special kind of flash, also available as slave units, is the ring flash. These units fit around the lens and fire a circle of light on the subject. They are ideal for shadowless close-up photography such as that used in medical, dental, and nature photography. Because ring flash is so flat (shadowless), some units allow you to fire just one side or the other so the flash casts shadows that show surface modeling in the subject.



A ring flash used for close-up photography. Courtesy of [Digi-Slave](#).